

Title: Bioimage analysis for estimation of mid-loin marbling from external marbling on the boneless pork loin

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Abstract:

Background: The marbling of 240 boneless pork loins cut to Japanese specifications was assessed chemically, and with bioimage analysis. The cranial, caudal, and ventral loin surfaces, and the surface of a mid-loin chop were imaged with a consumer camera. The percent intramuscular fat (%IMF) of the mid-loin chop was also chemically determined. Images were analyzed to quantify proportions of marbling on the meat surfaces.

Results: The %IMF spanned 1.41-6.33% (mean = 2.70, SD = 0.82). Correlations of % IMF to % image marbling of midloin, cranial, caudal, and ventral loin surfaces were $r = 0.86, 0.56, 0.72,$ and 0.64 respectively. Stepwise regression to explore the combined relationship of externally visible marbling with mid-loin marbling selected variables in the order of caudal, ventral, and cranial surfaces, for a model $R^2 = 0.58$ ($P < 0.0001$; $C_{(p)} = 2.40$), with the cranial surface increasing R^2 by 0.02 (Prob > F: 0.02).

Conclusions: Results suggest that of the exterior surfaces, marbling on the caudal loin is most closely related to mid-loin %IMF, while marbling on caudal and ventral surfaces, combined, are the strongest contributors to estimation of mid-loin %IMF.

Take home message: In intact boneless pork loins, marbling at the exposed caudal surface was the best estimator of mid-loin %IMF. When external sites were combined, caudal and ventral surfaces, together, were moderately strongly related to %IMF at the mid-loin.

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